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Variational Approach to a Class of *P-T* Symmetric Hamiltonian Systems J. MIKALOPAS, J.D. MANCINI, Kingsborough College of CUNY, Brooklyn, NY, V. FESSATIDIS, Fordham University, Bronx, NY, F.A. CORVINO, Stevens Institute of Technology, Hoboken, NJ — In the usual study of non-relativistic Quantum Mechanics, one chooses a real (Hermitian) potential so as to ensure a real energy spectrum for the corresponding Schrödinger equation. In recent years, a number of authors have studied a class of complex potentials which are invariant under the combined symmetry P-T (here the operator P represents parity reflection and the operator T represents time reversal). For such P-T symmetric systems it has been shown that the energy eigenvalues of the Schrödinger equation are real so long as the P-T symmetry is not spontaneously broken. Thus it would appear that rather than the usual demand for Hermiticity, it may be sufficient to have a P-T invariant Hamiltonian so long as the energy spectrum remains real. It should be noted however that this conjecture has not been proven, but rather has been demonstrated to be true for several sample Hamiltonian systems. Here we wish to apply a recently developed ansatz wherein a variational basis is constructed by systematically taking derivatives of an initial trial state with respect to a (set) of variational parameters. In particular we shall study the spectrum of the Hamiltonian $H = p^2 + x^2(ix)^\alpha$ (α real) as a test case for the ansatz.

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